

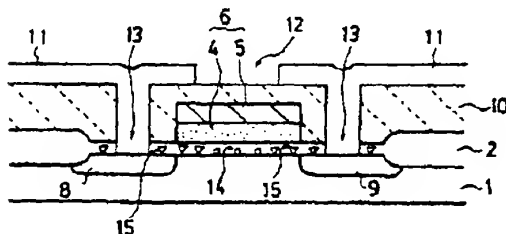
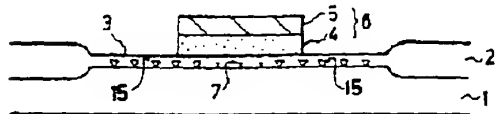
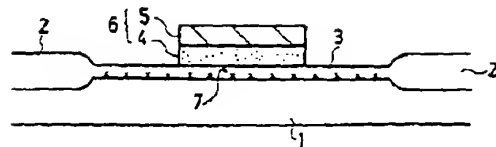
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TITLE : MOS FIELD-EFFECT TRANSISTOR  
 AND MANUFACTURE THEREOF



ABSTRACT : PURPOSE: To arrange that hydrogen-terminated silicon atoms are hardly returned to an interface level by hot electrons generated during an operation and to stabilize an operating characteristic by a method wherein silicon atoms bonded to halogen atoms are contained in a gate oxide film near a drain region.

CONSTITUTION: A gate electrode 6 is formed; and after that, it is heat-treated in an atmosphere of a mixed gas of a halogen element, e.g. chlorine  $\text{Cl}_2$ , oxygen  $\text{O}_2$  and nitrogen  $\text{N}_2$ . The chlorine creeps from the surface of a gate oxide film 3; it is diffused into the gate oxide film 3; and it is bonded to interface-level silicon atoms 7 near the boundary between the gate oxide film 3 and a silicon substrate 1. As a result, bonding pairs of silicon atoms having no bonding partner are terminated at the chlorine and are changed to chlorine-terminated silicon atoms 15. Since the bonding strength of chlorine atoms Cl to silicon atoms Si is stronger than the bonding strength of hydrogen atoms H to silicon atoms Si, their bonded state is not detached by hot electrons. Consequently, electrons during an operation are not scattered and an operating characteristic is not worsened.

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